Planned Implementation of VTEC

Statement of the Issue
NWS has developed a new code called Valid Time Event Code (VTEC) that will facilitate the automated delivery and routing of NWS text messages.

Discussion
VTEC coded messages will enable the NWS to better specify the content of a message or message segment so customers or commercial suppliers of meteorological information can automate further the delivery of NWS text products.

The past year has been spent in refining the code and getting the software written to create the VTEC strings in our computers (Advance Weather Interactive Processing System-AWIPS). The software is planned to be implemented this summer on a limited basis. This will allow NWS field offices and our partners to get accustomed to the system and make software adjustments to external delivery systems. Initially, VTEC will be included in non-routine NWS messages such as those for winter storms and non-precipitation warnings. Full implementation is planned for about June 2000.

The VTEC Implementation Plan is enclosed.

Impacts/Input
We are open to any comments on the proposed implementation schedule and possible impacts on customer software and delivery systems. Are there any potential problems that NWS has not considered? Are there any items that you do not understand within the VTEC code?

Valid Time Event Code:

An Aid To The Delivery of NWS Text Products

Implementation Plan

Office of Meteorology

April 1999

Valid Time Event Code: An Aid To The Delivery of NWS Text Products

1.   Introduction

The National Weather Service (NWS) delivers many products to a wide variety of external customers. Those customers in turn use NWS products for an extensive array of applications. To accomplish their distribution, commercial firms have built sophisticated systems utilizing NWS products and provide those directly or indirectly to an increasingly diverse customer base but have repeatedly requested greater specification of the content of NWS text products. Increasing internal automation through the Automated Weather Information and Processing System (AWIPS) makes it possible for NWS to meet those requirements. Valid Time Event Coded (VTEC) messages will enable NWS to better specify the content of a message or message segment so end customers or commercial suppliers of meteorological information can more fully automate the delivery of NWS text products.

2.   History - The Universal Generic Code To VTEC

The first attempt to provide specific addressing information in NWS products was the Universal Generic Code (UGC) in the mid-1980s. The UGC made it possible for NWS to address its messages to a specific county or counties, using NWS-unique "zones." Using the UGC, a forecast or warning could be automatically addressed to a single county, multiple counties, or an entire state if the weather event warranted. The UGC facilitated the first attempts to automate the delivery of NWS text products to end customers through the NOAA Weather Wire Service (NWWS). The system continues to allow customers to select the specific message types they want to receive and enables commercial weather providers to tailor the product stream delivered to their clients.

Field and regional offices work closely with NWS customers on a routine basis. These interactions have led to many product changes. An example of changes as a result of customer input is the Winter Storm Watch/Warning (WSW) product. Winter storm events frequently have a variety of impacts across a field office's county warning and forecast area (CWFA). To provide specific information to a part of an office's area of responsibility, the WSW has been divided into segments using UGC addressing as is done with the Short Term Forecasts (NOW) and Zone Forecast Products (ZFP).

Customers familiar with the product segmentation efforts are in favor of its expansion. However, several indicated a need for further automation of NWS messages in order to deliver the messages to their clients with minimal handling by intermediary systems whether via NWWS or through those of private meteorological interests. An example of such an automated use of NWS messages is television message crawl systems used to relay severe weather and flash flood watch/warning information to the public. Customer interactions and delineation of requirements

led to the NWS development of VTEC to facilitate automated message delivery for most NWS forecast and warning programs.

3.   Software For Field Implementation of VTEC

The benefits of VTEC for external customers are significant in that it will enable full, or nearly full, automation of the delivery of NWS text messages to the end customers. However, the workload required to create the VTEC for each message segment would be significant if it were not automated through AWIPS. The needed software will be available in AWIPS Build 4.2, scheduled for field installation beginning in July 1999.

4.   Validation Testing and Implementation Schedule for VTEC

In order to thoroughly test, and possibly refine, VTEC, implementation will be restricted initially to the Non-Precipitation Weather (NPW) and Winter Storm Warning (WSW) programs. A limited implementation will have the benefit of not impacting other warning and forecast programs during the time when refinements to the code may occur. It will also afford customers more time to adjust or develop software to maximize the use of VTEC. During the implementation, NWS will consult with customers who have offered to work with NWS in the development of VTEC.

The Techniques Development Laboratory (TDL) has developed software to create the VTEC strings and insert them into text messages. This capability has been incorporated into AWIPS software Build 4.2. Planning calls for initial testing of Build 4.2 and VTEC at the AWIPS Operations and Test Evaluation sites (OT&E), as well as WFOs Pittsburgh, PA and Charleston, WV. OT&E testing should begin in the May 1999. Full field implementation of Build 4.2 is scheduled for July 1999.

To use VTEC, each office will need to activate the characteristics tables provided by TDL in Build 4.2. This will "turn on" the creation of the VTEC strings for the selected products. Internal training, practice and testing of VTEC for both the NPW and WSW products should begin soon after the delivery of AWIPS Build 4.2. Operational use of VTEC is proposed to begin September 1, 1999. Assuming the limited implementation is successful, full implementation nationwide of VTEC is planned to occur soon after the delivery of AWIPS Build 5.0, currently scheduled for summer 2000. The exception will be the severe convective storms-related programs (severe thunderstorms and tornadoes). This exception is necessary because of the significant changes already planned near that time in relation to the Convective Watch Decentralization (CWD). VTEC may be included in severe storms related products after completion of the CWD.

5.   Description of VTEC Elements

VTEC is designed for use with non-routine NWS text products. The code string is located on the line(s) directly below the UGC. It provides information supplementary to the

UGC string and permits selective dissemination and reception of NWS products.

The distinction between an "event" and a "product" must be clearly understood when using the VTEC. An **event** is defined as a specific combination of phenomena and significance level to which the public is being alerted. A **product** is the entire message issued to the public, which may contain information regarding more than one event. For example, if "heat" is the phenomena and the significance level is an "advisory", then a "heat advisory" is the event and an NPW is the product used to alert the public. Similarly, a blizzard warning and a lake effect snow watch are each events. However, the public is alerted to them via the WSW product.

THE VTEC LINE

A VTEC line has a two-section format. The first section contains the event and issuance information. The second section contains the valid time of the event. If multiple events are addressed under one UGC string, each event is coded in a unique two-section block but is aligned one after another on the same line. A maximum of two VTEC strings will be placed on a single line. The VTEC string is located on the line immediately following the UGC on a line by itself. Any listing of counties affected or other words identifying the area affected by the segment shall begin on the line following the VTEC line(s).

The generic VTEC Format:

$$/AAA.CCCC.PP.S.\#\#\#.D_BD_BHHMM-D_ED_EHHMM/$$

where "AAA.CCCC.PP.S.###" is the "event", and the coding is interpreted as:

AAA - Action	D_BD_B - Event Beginning Date/Time Group
CCCC - Office ID	D_ED_E - Event Ending Date/Time Group
PP - Phenomena	HH - Hour
S - Significance	MM - Minute
### - System Tracking Number	

The "/" and "." in the generic format are delimiters for ease in coding and decoding of VTEC and facilitate future changes to the code, if necessary. They also make it easier to visually read VTEC.

The **Action** (AAA) identifies the issuance status of the event. It specifies whether the event is new, continued, extended, canceled, corrected, or expired, or if an issuance is for test purposes. Appendix A contains a list of Action Elements.

Action Code Definitions:
>   **NEW** (NEW) - Used for an initial issuance of an event or for an event that has replaced another event for the same area.
>   **CONTINUED** (CON) - Used when providing updates to an existing event, where no

changes were made to the area, valid time period, or Significance category. No changes were made to the valid time period of an existing event. This action is typically used with watches combined with other active events. Also, it would be used when providing updates to ongoing events.

EXTENDED (EXT) - The valid time period of an existing event has been made longer or shorter by changing either the Event Beginning or Ending Date/Time Group(s).

CANCELED (CAN) - Used when an event has been canceled prior to its Event Ending Date/Time Group.

EXPIRED (EXP) - Used when the Event Ending Date/Time Group has been reached and the event is no longer active.

CORRECTION (COR) - A change to the coding or area affected by a previous message was in error, or an error in spelling or wording usage, etc., was made and is corrected.

TEST (TES) - The event message has been issued strictly for testing purposes.

The **Office ID** (CCCC) is the 4 letter identifier indicating the NWS office with the primary or normal responsibility for the affected area. The CCCC shall be the modernized SID (e.g., KLWX vs. WBC). In most cases the office ID will be the same as the office identified in the Mass News Disseminator (MND), however, for severe thunderstorm and tornado watches the CCCC will be SPC until the responsibility for severe storm watches is transferred to the field offices. Also, any NWS office providing backup service shall use the primary office's CCCC.

The **Phenomena** (PP) identifies the type of weather or non-weather occurrence to which the public is being alerted. Appendix A contains a list of Phenomena.

The **Significance Code** (S) identifies the seriousness (level of threat) of the weather or non-weather occurrence to which the public is being alerted. The significance may be at the level of a warning, watch, advisory, outlook, or statement. Appendix A contains a list of Significance Elements.

The **System Tracking Number** (###)is the sequential numbering of all meteorological systems impacting a field office during a calendar year. The System Tracking Number shall be used for all weather events caused by a system. It shall be assigned by the forecaster for each new meteorological system triggering the event(s) for the primary office's area of responsibility. For example, if a prior meteorological system caused any watches, warnings, advisories, statements or outlooks, each event would have the same System Tracking Number, say 016. The next meteorological system causing other watches, warnings, etc., to be issued would each be 017. The Tracking Number shall begin with 001 and continue through 999 for the calendar year. If there are more than 999 meteorological systems impacting an office in a particular year, the office shall begin again at 001. If backup service is required from another office the primary office's prior or existing System Tracking Number will be used.

System Tracking Numbering is required by customers to unambiguously document how a message of one type is related to a previous message of the same type. Initial VTEC planning documents used the watch numbering but this has been abandoned in favor of the System

Tracking Number which is conceptually simpler and provides for more explicit numbering of systems which may never reach sufficient potential to warrant a watch (e.g., fog or light snow). . The use of the System Tracking Number in the original and succeeding messages related to one meteorological system provides definitive tracking of the linkage of one NWS message to the next message of the same type (e.g., WSW). For example, the System Tracking Number shows if an advisory issued by this message is related to a previous watch which has now been determined will not reach warning criteria, or if a warning had been in effect and was previously associated with a watch will not reach warning criteria. The office originating a watch will need to enter the System Tracking Number (and, therefore, internally track the numbers they have used for a calendar year) when creating the VTEC string, as well as the Event beginning and Ending Date Times. The AWIPS will automatically suggest a System Tracking Number which the forecaster may accept or change, as necessary. The rest of the string will be automatically coded based on the selections they have made in using the Watch/Warning generation (WAWA) capabilities built into AWIPS.

The **Event Beginning and Ending Date/Time Groups** (D_BD_BHHMM and D_ED_EHHMM) respectively, identify the valid time period of the event in Universal Coordinated Time (UTC).

- The Event Beginning Date/Time Group identifies when the Significance Element (outlook, watch, warning, etc.) will become effective. This will not necessarily correspond with the date/time of the product issuance.

- The Event Ending Date/Time Group identifies when the Significance Element will no longer be in effect. This will not necessarily correspond to the product purge date/time contained as part of the UGC string.

It is important to fully understand each of these times and others included in a text message: the product issuance time and the product purge time. The product issuance time is the time when a message is entered into AWIPS for dissemination to customers outside the issuance office (i.e., when a message is "sent") and is included in the Mass News Disseminator (MND).

The product purge time is the time when a message should no longer be used and is the time to be included in the UGC date time group. In the short fuse warning programs, this is normally also the time when a warning expires. In the long fuse watch/warning programs, the product purge time is the time when a "fresh" message can be expected by the customers. For example, for a winter storm watch issued on a Tuesday morning at 5 a.m. local time on the second of the month, for a watch in effect for tonight and Wednesday, the product purge time is not the time when the watch expires (for example, using this case, 032100), but rather a time later on Tuesday (e.g., 021600) when new information should be available for the local forecaster to update the information contained in the WSW message. Typically this is 6 to 8 hours from the product issuance time. The product purge time is flexible and selectable by the forecaster.

The Event Beginning Date/Time Group is the UTC time when an office wants a watch

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warning or advisory to go into effect. Continuing the example above, the D_BD_BHHMM would be 022300 assuming the watch is in effect at 600 p.m. for an office on Eastern Standard Time.

Similarly, the Event Ending Date/Time Group is the UTC time when an office wants a watch, warning, or advisory to expire. Both the beginning and ending times are needed by customers to automate the delivery and use of NWS products.

Special coding of the D_B D_BHHMM group is used when an action has been taken after the event has begun.   When an action has been taken after the event has begun, a string of zeros (000000) will replace the Event Beginning Date/Time Group. This will prevent an accidental invalidation of an ongoing event. For the same reason, updates to an event (e.g., further information on a watch or warning that was issued previously) shall use "000000" in the Event Beginning Date/Time Group to indicate that it is ongoing (i.e., not new) and not a new issuance.

Following are examples of date/time group coding when the event is issued prior to or within the valid time periods.

ACTION	PRIOR TO VALID TIME	WITHIN VALID TIME
NEW	/NEW.KRLX.BZ.A.002.221700-230400/	N/A
CONTINUED	/CON.KCLE.LE.A.357.181500-190200/	/CON.KCLE.LE.A.357.000000-190200/
EXTENDED	/EXT.KLWX.WS.A.002.161800-162200/	/EXT.KLWX.WS.A.002.000000-170100/
CANCELED	/CAN.KMKX.SN.W.125.072200-080930/	/CAN.KMKX.SN.W.125.000000-080930/
EXPIRED	N/A	/EXP.KMSO.WC.Y.009.000000-180800/
TEST	/TES.KLOT.HT.Y.000.081430-081500/	/TES.KLOT.HT.Y.000.000000-261500/

Note 1: When a NEW event is effective upon issuance, the Event Beginning Date/Time Group is coded with the release time of the product. For example:
"/NEW.KEAX.ZR.A.087.141252-141430/"
Note 2: The System Tracking Number shall be set to 000 for all test products.

6.   VTEC Examples

A Single Event:

        VAZ088>98-261300-
         /NEW.KAKQ.FG.Y.000.260700-261400/

        Interpretation: A dense fog advisory was issued. It is valid on the 26th from 07 to 14Z.

        MEZ001>030-NHZ001>010-013-014-021800-
        /CAN.KGYX.BZ.A.021.000000-021900/

        Interpretation: A blizzard watch was canceled on the 2nd effective at 19Z.

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OHZ010-081445-
/TES.KCLE.HT.W.000.081415-081445/
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Interpretation: A test heat warning was valid on the 8th from 1415 to 1445Z.

Multiple Events:
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SCZ034-046-048>050-50123-122030-
/NEW.KCHS.CF.W.108.121530-130100//CON.KCHS.HW.W.107.000000-121900/
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Interpretation: A coastal flood warning was issued. It is valid from 1530Z on the 12th until 01Z on the 13th. A high wind warning was continued and is valid until 19Z on the 12th.

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NYZ006>008-301230-
/EXT.KBUF.LE.A.099.301400-010500//CON.KBUF.FZ.Y.099.000000-301430/
/EXP.KBUF.SN.Y.099.000000-301200/
```

Interpretation: A lake effect snow watch was extended before the event began. It is valid from 14Z on the 30th until 05Z on the 1st. A freezing rain advisory was continued. It is valid until 1430Z on the 30th. A snow advisory expired on the 30th at 12Z..

An Example Product:

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ZCZC BUFWSWBUF
TTAA00 KBUF 300628

URGENT - WINTER WEATHER MESSAGE
NATIONAL WEATHER SERVICE BUFFALO NY
230 AM EST MON NOV 30 1997

...A LAKE EFFECT SNOW WATCH IS IN EFFECT FOR EASTERN LAKE
ONTARIO COUNTIES TODAY THROUGH EARLY TUESDAY MORNING...
...THE SNOW ADVISORY FOR WESTERN NEW YORK HAS BEEN CANCELED...

.WEST WINDS WILL  DEVELOP LATE THIS MORNING AND BRING LAKE
 EFFECT SNOW TO COUNTIES EAST OF LAKE ONTARIO.

NYZ006>008-301230-
/CAN.KBUF.SN.Y.247.000000-301630//EXT.KBUF.LE.A.248.301400-010500/
NORTHWEST COAST-
INCLUDING THE CITIES OF...OSWEGO...WATERTOWN
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...A LAKE EFFECT SNOW WATCH IS IN EFFECT FOR EASTERN LAKE ONTARIO COUNTIES TODAY THROUGH EARLY TUESDAY MORNING...
...THE SNOW ADVISORY FOR WESTERN NEW YORK HAS BEEN CANCELED...

SNOWFALL AMOUNTS UP TO 8 INCHES MAY OCCUR BY MIDNIGHT WITH HIGHER TOTALS POSSIBLE IN LOCAL AREAS.

FIVE INCHES OF SNOW FELL ACROSS THE AREA SUNDAY AFTERNOON AND EVENING.
$$

.NYZ001>005-009>025-300730-
/CAN.KBUF.SN.Y.247.000000-301630/
WESTERN NEW YORK-
INCLUDING THE CITIES OF ...BUFFALO...ELMIRA...JAMESTOWN...
ROCHESTER...SYRACUSE

...THE SNOW ADVISORY FOR WESTERN NEW YORK HAS BEEN CANCELED...

SNOW HAS ENDED OVER THE REGION. FIVE TO SIX INCHES OF SNOW FELL ACROSS THE AREA SUNDAY AFTERNOON AND EVENING.
$$
etc.

APPENDIX A - Listing of VTEC Elements

ACTIONS
NEW   NEW EVENT
CON   EVENT CONTINUED
EXT   EVENT EXTENDED
CAN   EVENT CANCELED
EXP   EVENT EXPIRED
COR   CORRECTION
TES   TEST

SIGNIFICANCE ELEMENTS
W   WARNING
A   WATCH
Y   ADVISORY
S   STATEMENT
O   OUTLOOK

PHENOMENA *

BZ	**BLIZZARD**	SC	SMALL CRAFT
WS	**WINTER STORM**	GL	GALE
SN	**HEAVY SNOW/SNOW**	SR	STORM
LE	**LAKE EFFECT SNOW**	HF	HURRICANE-FORCE MARINE
BS	**BLOWING/DRIFTING SNOW**	TR	TROPICAL STORM
IP	**SLEET**	HU	HURRICANE
ZR	**FREEZING RAIN**	LW	LAKE WIND
FZ	**FROST/FREEZE**	LS	LAKESHORE
WC	**WIND CHILL**	CF	COASTAL FLOOD
HW	**HIGH WIND**	SV	SEVERE THUNDERSTORM
FG	**FOG**	TO	TORNADO
HT	**HEAT**	FW	FIRE WEATHER (RFW, FWW)
FF	FLASH FLOOD	RH	RADIOLOGICAL HAZARD
UR	URBAN/SMALL STREAM FLOOD	HM	HAZARDOUS MATERIALS
DB	DAM BREAK FLOOD	VO	VOLCANO
IJ	ICE JAM FLOOD	AV	AVALANCHE
RF	RIVER FLOOD	TS	TSUNAMI
MA	MARINE (SMW, MWS)		

* Note: The phenomena to be used in the initial phase of the implementation of VTEC are those associated with the WSW and NPW programs and are indicated by bold print. It is anticipated the VTEC will be included on all non-routine text products in the future. Therefore, coding schemes and combinations have been accounted for that are not presently used in NWS operations.